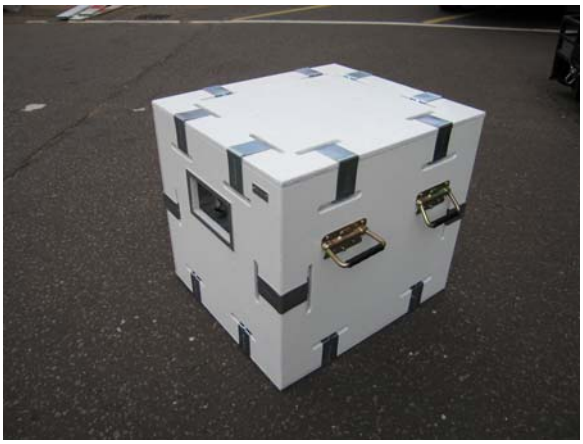
Description of Extreme Cold Power System.

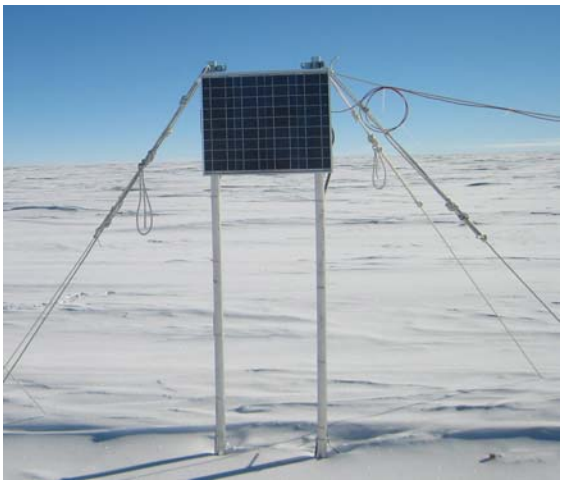
A modular environmental power system designed by British Antarctic Survey for use in extreme cold locations in polar regions. The system is typically used for power year round instrumentation such as magnetometers, GPS receivers, weather stations etc.

The system can support solar panel sizes from 20W to 85W, battery capacities from 200Ahr to 800Ahr and is available with a 5W vertical wind generator option. The highly modular nature of the system means that many configurations are possible and we can help model your application to provide the best solution. The output voltage is nominally 12V with a maximum discharge current 15A.

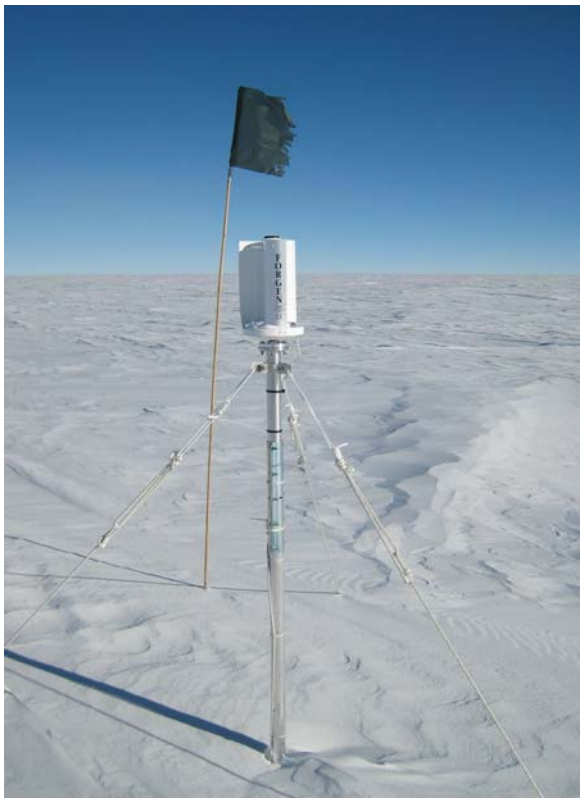
The system exists of a number of heavily insulated battery boxes that can be daisy chained together to the desired capacity. Each box contains 200Ahr of AGM cells and the circuit that manages their charge and the temperature.



The main energy source is a solar panel. For year round operation this is mounted vertically to maximise energy collection as polar night begins or ends.

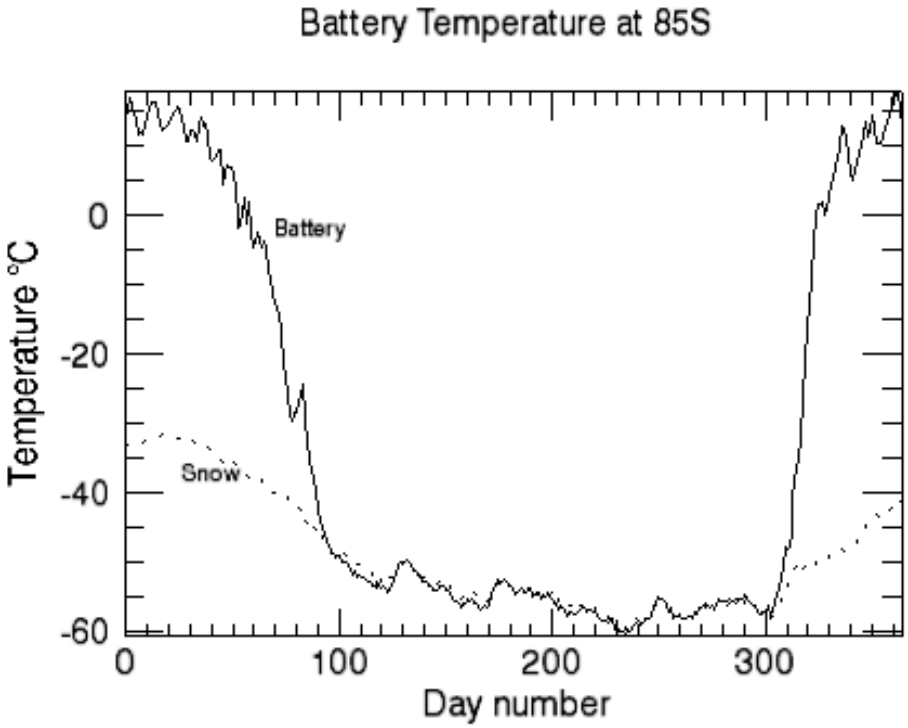


Optionally a small wind generator can be fitted to supplement the battery power during darkness.

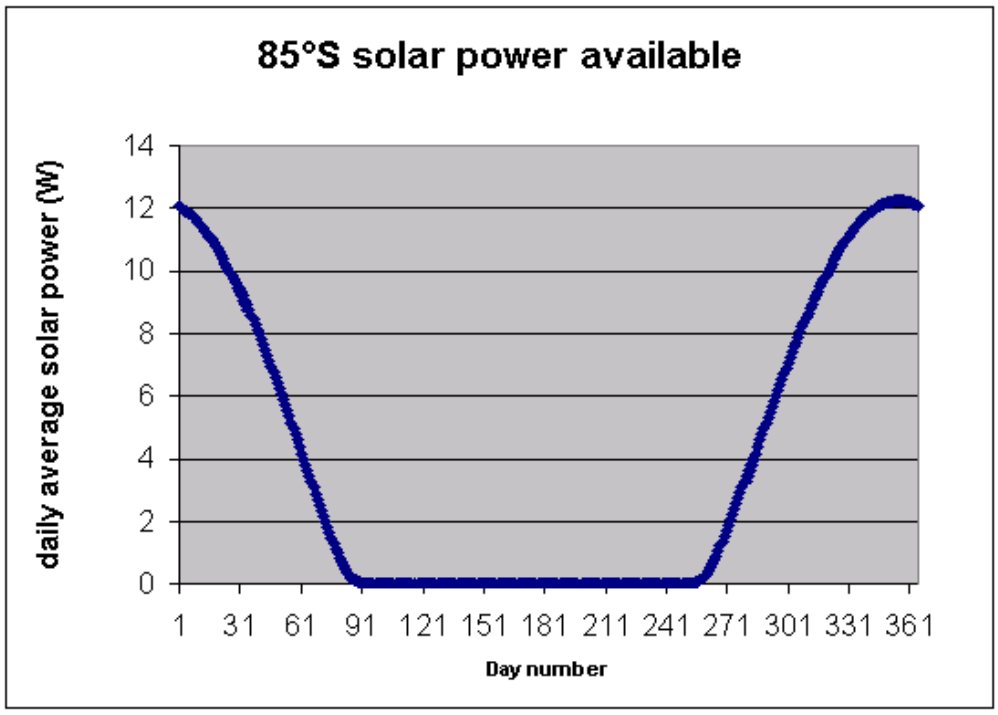


The interconnecting cables are all extremely robust and retain flexibility in cold conditions.

The insulation and thermal management of the batteries results in them spending much of their time above ambient temperature, particularly in the important period when charging is taking place (a battery can be discharged when cold but charge efficiency is very temperature dependent).



We can assist in accurately modelling the power available from solar and wind in order to provide the most optimum solution for your application. The example shows the average solar power available from a vertical 40W solar panel over snow at 85°S with 70% cloudy conditions.



With two battery boxes (total capacity 400Ahr), this amount of solar power and a 0.5W average power usage results in less than 50% of the battery capacity being used in the depth of winter.